

# Studio RPC 650 TP

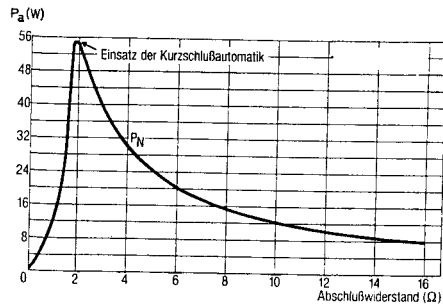
## Super HiFi

Bedienungsanleitung  
Operating Instructions  
Notice d'emploi  
Istruzioni per l'uso  
Gebruiksaanwijzing

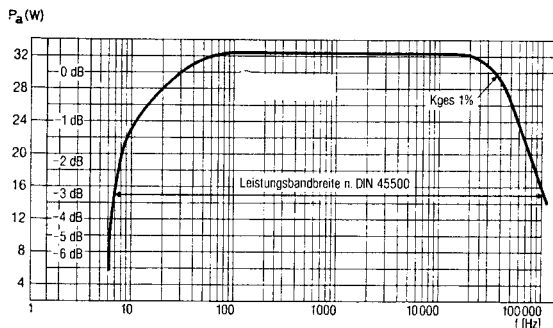


**GRUNDIG**

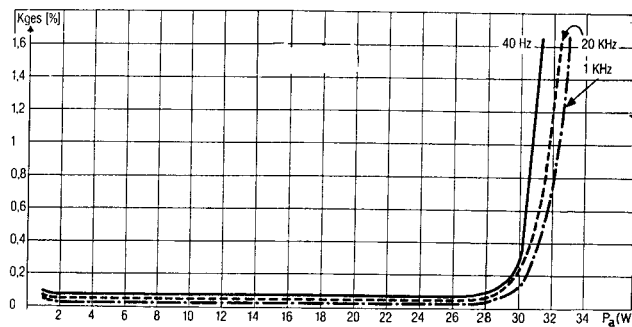
**Diagramme**  
(die Kurven zeigen  
den typischen Verlauf)



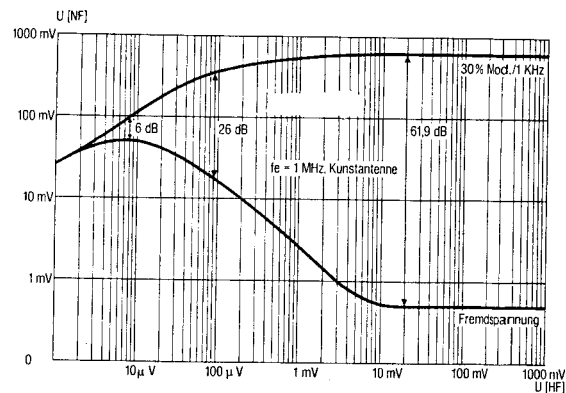
**A) Ausgangsleistung bei 1 kHz über  $R_a$ .  
Nur 1 Kanal angesteuert**



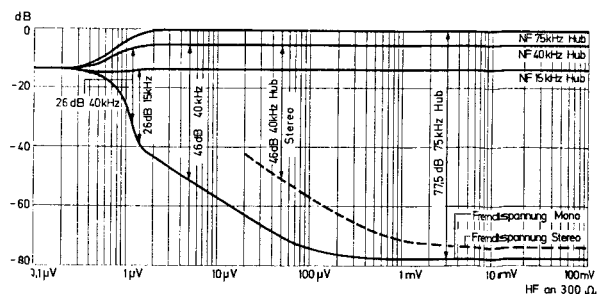
**C) Leistungsbandbreite**



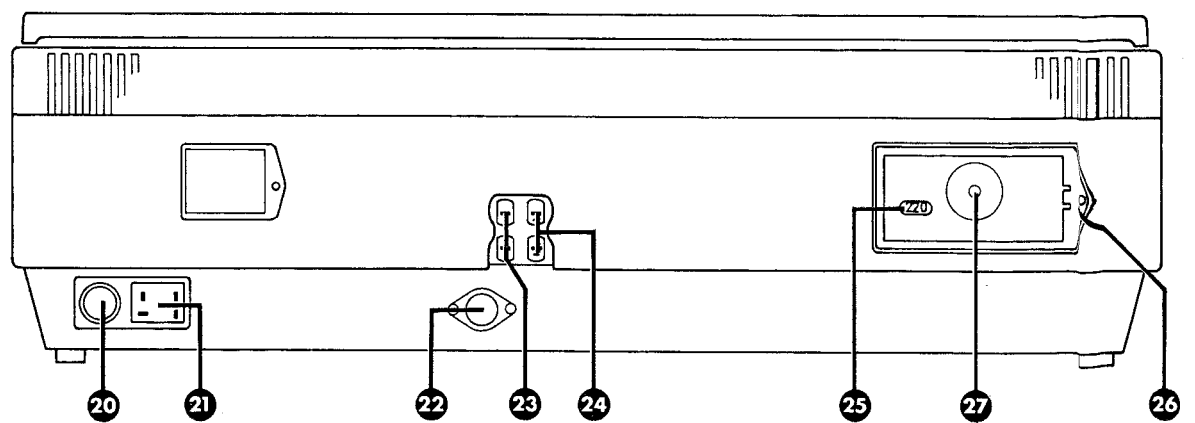
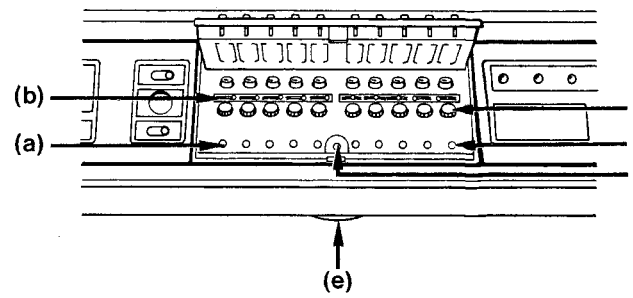
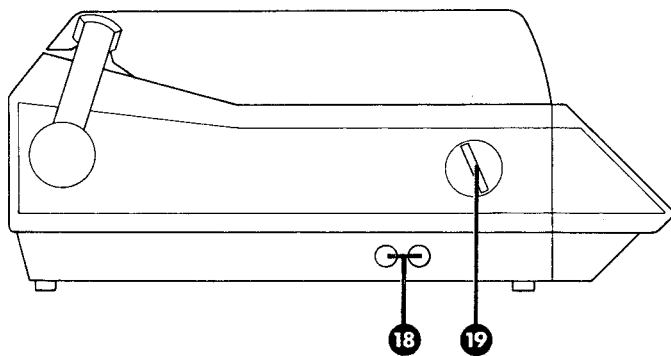
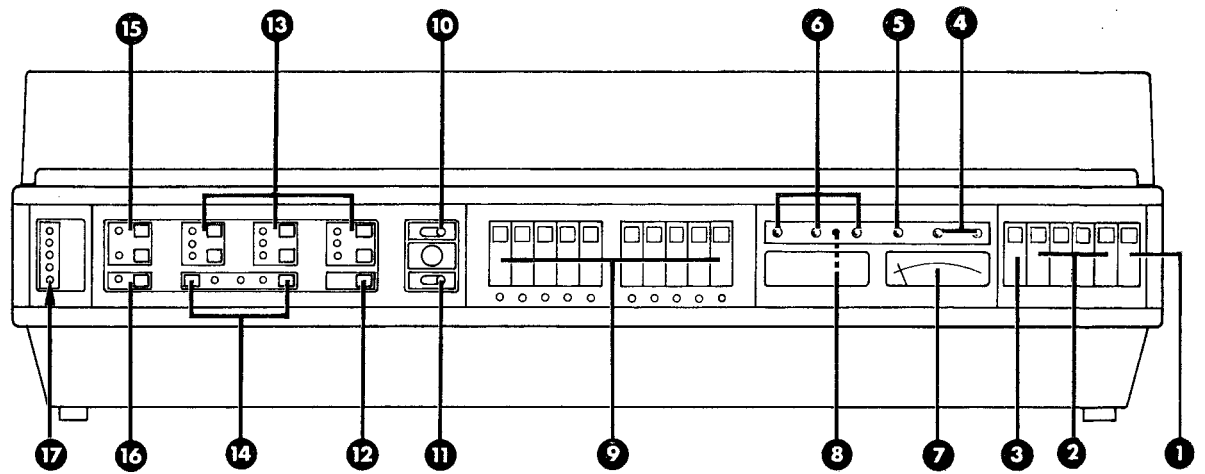
**B) Klirrfaktor bei verschiedenen Frequenzen,  
(Zweikanalaussteuerung,  $R_a = 4 \Omega$ , Meßeingang TB)**






**D) AM-Signal- und Fremdspannungsverlauf  
in Abhängigkeit von der Antennenspannung**



**E) FM-Signal- und Fremdspannungsverlauf  
in Abhängigkeit von der Antennenspannung**



- 1 Stand-by button \* (O ●)  
Switches the radio / amplifier section "on" (from stand-by) and "off" (back to stand-by).
- 2 Function button \*  
RF = Radio  
CA = Playback from built-in cassette recorder  
PH = Playback from built-in record deck  
BA = Replay from external tape or cassette recorder
- 3 MPX Off button \*  
Switches off the stereo decoder (all (FM) VHF programmes received will be in mono).
- 4 MPX and NF (AF) indicators  
MPX for stereo radio  
NF for records, tape or cassette replay (also lights up with mono recordings, as these are replayed through both channels).
- 5 AFC indicator  
AFC automatically maintains the correct tuning point on VHF (FM).
- 6 Waveband indicators  
LW = Long wave  
MW = Medium wave  
UKW = VHF (FM)
- 7 Field strength meter on FM (VHF) –  
Tuning meter on AM
- 8 Digital frequency indication for FM, MW and LW  
(switch above for FM indication:  
depressed = FM frequency;  
released = FM channel).
- 9 Programme selection buttons \*  
To open the flap, push the spring catch (e) mounted on the lower edge firmly upwards.  
(a) Contact buttons for FM preset keys  
(b) Waveband selectors  
(c) Tuning knobs  
(d) AFC contact button
- 10 Noise filter switch  
(left = off, right = on)
- 11 Contour selector switch
- 12 Quick button for sound pauses \*
- 13 Buttons for electronic control \*  
of bass, medium tones and treble
- 14 Buttons for stereo balance \*
- 15 Buttons for volume control \*
- 16 Button for Linear / Contour selection \*
- 17 Indicating lamps for loudspeaker /  
headphone operation and stand-by  
LS 2 = Loudspeaker group 2  
1 + 2 = Both loudspeaker groups  
LS 1 = Loudspeaker group 1  
 = Headphone  
Stand-by = Ready to receive commands
- 18 Headphone sockets
- 19 Switch knob for stand-by and selection  
of loudspeaker / headphone operation
- 20 Tape socket (universal socket)
- 21 Aerial sockets  
Y for AM aerial (LW/MW)  
 for earth  
 for FM dipole (300 Ω)
- 22 Socket for VHF (FM) aerial rotator  
(special accessory)
- 23 Connecting socket for loudspeaker  
group 2
- 24 Connecting socket for loudspeaker  
group 1 (L = left channel; R = right  
channel)
- 25 Mains voltage indicator  
(connect to 220 V **only**)
- 26 Contact point of screwdriver to press  
out the cover (e. g. to replace a fuse).
- 27 Possibility for storing a 45-rpm spindle  
adapter (45-rpm records)

Be sure to read the separate instruction books supplied for the built-in record player and cassette recorder before using the RPC.

#### Important

The case of the unit should be treated as a piece of furniture. The unit should not be subjected to high temperatures or high humidity and should only be cleaned with a soft cloth (preferably anti-static). Never use abrasive polishes or cleaning agents as the surface will almost certainly be damaged. Please also note the inscriptions at the bottom of the case!

The German Federal Postal Authorities draw your attention to the fact that the "General Sound and TV-Radio Licence" entitles you only to install and to operate sound, TV and radio receivers. Only radio transmissions and no other kind of transmissions may be received by means of these sets.

\*) = can be remotely controlled (stand-by)

### Mains Voltage, Mains Fuses

This unit must be connected to AC supplies of 220/50 Hz **only**. (Do not alter mains voltage adjustment)!

The mains fuse is accessible on the right hand side after removing the cover in the rear panel. For this disconnect unit from the mains, loosen the screw and use a small screwdriver at point 26 to press out the cover.

A fuse T 1 A must be used (T = anti-surge).

Under no circumstances should the fuse be repaired or replaced with a fuse of a higher rating.

### Important Note

For safety reasons unplug the appliance from the mains before gaining access to the fuses. If in doubt please consult your dealer.

### Additional information for sets sold in Great Britain

The set is factory-preset to operate from a mains supply of 240 V AC. Your dealer will install your set for you and ensure that your local electricity supply is suitable and no further adjustments should be necessary. We recommend that a 13 amp 3-pin plug be used, fitted with a 2 amp fuse. The brown lead should be connected to the live pin (marked L or red or brown) and the blue lead must be connected to the neutral pin (marked N or black or blue). On no account should either of the wires be connected to the earth pin (marked E or green/yellow). If other mains plugs are used please ensure that they are protected with a 5 amp fuse.

**We recommend that the set be disconnected from the mains when not in use for long periods.**

### Aerials

In primary service areas good results can be obtained on FM with a simple room dipole eg: GRUNDIG FM strip dipole.

For the best possible results we recommend the use of an outside FM dipole especially when receiving stereo broadcasts. Remember 10 times as much aerial signal is required when receiving a stereo transmission. Even an outside FM dipole may not be suitable in mountainous regions or for long distance reception unless it is mounted as high as possible above the roof of the house.

On the back of the unit there are four flat sockets for aerials and earth 21. The two sockets on the right are for connecting a 300  $\Omega$  FM dipole. When an outside FM dipole is used AM (LW, MW) reception may also be improved because the AM and FM aerial sockets are connected together via a shorting link mounted between the two sockets.

If separate outside aerials for FM and MW/LW or a communal aerial system is being used, the shorting link must be removed otherwise inter-action between the two aerials will occur.

Socket  $\Upsilon$  is intended for the connection of an external AM aerial.

Socket  $\perp$  is for earth connection.

Socket 22 is provided at the rear of the RPC for connecting the special VHF aerial rotator accessory.

If you are not sure of signal conditions in your area, and remember that a good signal is essential for optimum stereo reception, we suggest you contact your dealer who will be pleased to advise you as he will be familiar with the conditions for reception in your area.

### Loudspeakers

To be able to fully utilize the reproduction quality and power of the RPC, HiFi loudspeakers of high quality and high wattage are required.

The rated impedance is 4 ohms, min. 3.2 ohms per channel. Loudspeakers with an impedance of up to 16 ohms may be used but the amount of power the Studio can deliver will be reduced accordingly. Connecting sockets for two separate stereo loudspeaker groups (LS 1 and LS 2) are located at the rear of the unit — 24 and 25. The two loudspeaker groups can also be operated simultaneously in two separate rooms.

With nominal impedance (optimum matching) the unit gives its full output power. For stereo reproduction via loudspeaker group 1 or 2 the music/nominal power is 2 x 50/30 watts.

Via both loudspeaker groups (2-room stereo) the unit will deliver 4 x 30/10 watts.

It is important that the right-hand loudspeakers are connected to the respective socket R (right-hand channel), the same is valid for the left-hand channels (L).

For reasons of expediency place the loudspeaker group 1 (LS 1) in the same room, in which the unit is located.

### Note

You can order loudspeaker extension cables from our range of accessories under order No. 375a (5 metres long) or 376a (10 metres long).

### Headphones

Connecting sockets 18 (according to DIN 45 327) for 2 stereo headphones are located on the left-hand side of the case for those ardent music lovers who do not wish to disturb others and who themselves, do not wish to be disturbed. Headphones with an impedance of 5 to 2 000 ohms are suitable. We recommend GRUNDIG stereo headphones 216 or 223.

### Operating the Studio

With the RPC connected to the mains supply it is first set to stand-by by turning control knob ⑩, on the left side panel, counterclockwise. The "stand-by" indicating lamp ⑪ will light up, indicating that the electronic-control circuit of the studio is ready to receive commands. The „switch on“ command can now be given by lightly pressing one of the following buttons:

- Stand-by ① (besides this button the buttons RF and 1 will light up).
- RF, CA, PH, BA = Function buttons (When selecting RF = Radio, besides the stand-by button the programme selection button 1 comes again into function).
- Programme selection buttons 1 ... 10 (also with this direct selection the stand-by button and RF button will light up, thus indicating "radio on").

The indicating lamps (LED's) will show to which operating mode the studio is set.

If after the first command entry the LED adjacent to the headphone symbol lights up, only headphone operation is possible. For loudspeaker operation turn the switch knob ⑫ (counterclockwise) to the required position. The selected operating mode is indicated by LED's: LS 2 = loudspeaker group 2, LS 1 + 2 = both loudspeaker groups, LS 1 = loudspeaker group 1.

If you wish, that the last selected function (e. g. RF and programme selection button 3) be memorized when switching on from "stand-by" switch on again with the stand-by button ①. (Memory operation). In this case appear also the last selected values of the electronic volume, tone, contour and balance control (indication by light emitting diodes). When switching on with switch knob ⑫ the electronic memory circuit is automatically set back to medium values (standardized adjustment, indicated by corresponding LED's).

To preclude wrong commands, the electronic switching circuit of the stand-by button operates with a time delay so that this button must be pressed somewhat longer than the others.

### Function Selection

By applying light pressure to the buttons ② the following functions can be selected (indication by lighting up of the button):

- BA = Tape replay from an external tape/cassette recorder (it is possible to simultaneously record the signal onto the built-in cassette recorder).
- PH = Record playback (it is also possible to simultaneously record the gramophone record onto the built-in cassette recorder and onto an external tape/cassette recorder).
- CA = Replay from built-in cassette recorder (it is possible to record the signal onto an external tape / cassette recorder).
- RF = Radio reception (it is possible to simultaneously record the programme onto the built-in cassette recorder and onto an external tape / cassette recorder).
- MPX AUS = Mono operation (only applicable to VHF reception).

### Programme Selection Buttons ③

The buttons can be programmed to store 10 different stations in the VHF, medium or longwave bands. The stored stations can be recalled instantly by lightly pressing the required button. The waveband selected will be shown by the indicators ⑥. The MPX indicator ④ will show if a stereo station is being received. If the MPX AUS (off) button was activated to override any stereo transmission it will be reset when the unit is switched back to RF operation.

The RPC has elaborate electronic control systems for ease of operation. The unit is very sensitive and capable of long distance reception.

### Station Programming

The tuning controls are mounted behind the programme buttons. The buttons are mounted on a flap which can be folded back after pushing the spring catch mounted on the lower edge upwards.

- Lightly press the RF button ②, the RF button will light.
- Apply light pressure to the required contact button (a), the indicator lamp above will light.
- Set the small lever (b) to the required waveband (U, M or L).
- Pull out the knurled tuning knob (c) as far as possible and tune in the required station. When tuning in VHF stations the following precautions should be observed: Switch off the AFC with the red button (d). If the MPX off button ③ has been pressed it should be pressed once more to extinguish the indicator lamp. It will then be possible to see if the station tuned in is transmitting in stereo, indicator lamp ④ will light. When tuning refer to the frequency meter ⑧ which will display the frequency of the station being received, final tuning should be made by referring to the signal strength meter ⑦. Now press the knurled knob home.

When all the required stations have been stored the AFC should be switched on. The AFC will assure correct tuning when a station is recalled.

The small coloured indicators underneath the touch buttons show which waveband the stored station is in. Red = VHF, green = MW, yellow = LW. The colours correspond to the colours of the light emitting diodes ⑥.

### Digital Frequency Meter ⑧

With this tuning aid, the tuning in of stations can be checked on all wave bands as to the frequency and on VHF / FM to the channel number as well. The frequencies indicated on VHF / FM are in MHz, on medium and long wave in kHz. The required frequencies or channels may be found in the transmitter table or the radio programme guide. On VHF / FM the digital meter may be switched with the small button above the meter: depressed = frequency indication, released = channel indication. The button is released by pressing it again.

### Stereo Radio Reception

The RPC is equipped for the reception of FM stereo transmissions according to the FM-multiplex system. The integrated PLL decoder is provided with an electronic switch which can distinguish if the transmitted programme is in stereo or mono. This automatic switch is effective when the MPX AUS button ③ is not illuminated. Stereo transmitters are indicated by lighting up of the red MPX light emitting diode ④.

### Automatic Frequency Control – VHF (AFC)

The AFC can be turned off by operating the small red button (d) behind the programme button flap. The indicator ⑤ shows when the AFC is switched on. The function of the AFC is to maintain precise tuning of a preset VHF station after it has been tuned.

If a distant station is to be tuned and there is a much stronger local station adjacent to it, the AFC should be turned off to avoid the receiver capturing the undesired stronger station. Remember that some transmissions are duplicated and the transmission having the greatest signal strength should be used. The signal strength will be indicated on the field strength meter ⑦.

### Electronical Control of Volume, Tone and Balance

Lightly pressing the volume + button increases the sound volume, pressing the volume – button decreases the sound volume. This is indicated by the respective LED: it blinks as long as the button is pressed, whilst the respective other LED lights up jointly, until the sound volume has reached medium value. When both LED's are lighting up simultaneously, the volume is adjusted to exact medium value (standardized adjustment).

If the selected volume is above the medium value, only the upper LED will light; if it is below, this is indicated by the lower light emitting diode. Whether the upper or lower end has been reached, can be recognized on that the respective LED stops blinking, i. e. it lights continuously, although the button is still being pressed. For adjusting the tone reproduction three separate pairs of buttons (for bass, medium tones and

treble) are provided. By lightly pressing the upper (+) or lower (–) buttons the respective sound frequency ranges are accentuated or de-emphasized. The indication of the LED's is the same as described under volume, with the exception of the medium value indication, for which additional LED's are provided.

For good stereo reproduction it is important that both channels are correctly balanced. The acoustic balance between loudspeakers can become upset by poorly positioned loudspeakers or unfavourable room conditions. For this reason the two balance buttons ⑭ are provided so that a proper stereo balance can be achieved. The LED indication for the balance is the same as described under tone control. (L = left; R = right).

### Sound Mute

By lightly pressing the QUICK button ⑫ the reproduction will be muted immediately. Blinking of the two volume LED's indicates this.

To switch the sound back on lightly press the QUICK button again. The sound is also restored by altering the volume or balance or changing the programme.

### Contour Switch

The contour facility is to compensate for the change in frequency response of the human ear as the sound intensity is reduced. A two-stage compensation switch ⑪ is provided which can be set to Contour I or II.

At medium and low volumes, the bass and treble are lifted slightly to give a balanced overall sound impression. In position CONTOUR II more accentuation of bass tones is encountered. Select this position when using low volume speaker systems at low sound volume. By pressing the LIN-CONT button ⑬ the physiological compensation can be switched off (the respective LED goes out). The set is now in the "linear" reproduction mode, which is of advantage when connecting loudspeaker systems of high volume and strong bass reproduction. It is generally recommended to switch to CONT. position (LED ⑬ lights up).

### Noise Filter

If the lever switch ⑩ is moved to the left the filter is operative. With the filter switched on all frequencies above 7 kHz are suppressed. The filter is particularly useful for removing high frequency hiss or distortion (noisy tapes or old gramophone records).

### Aerial Rotator

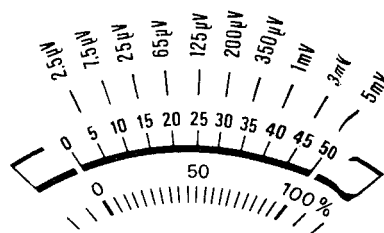
The RPC is fitted with a rear mounted socket ② for connection to the "programmable-rotor" aerial rotator manufactured by Stolle. The position of the aerial rotator can be programmed (details in the respective instructions) when the VHF stations are being tuned. When a station is recalled by lightly pressing one of the programme selection buttons ② (except buttons 9 and 10 and LW or MW) the VHF dipole will automatically be steered towards the transmitter.

### VHF Field Strength Meter

The field strength meter ⑦ works only on VHF and is particularly useful when the RPC is being used with the aerial rotator. If more than one station can be received carrying the same transmission, use the field strength meter to select the strongest station. The field strength meter can also be used to determine whether the station being received is worth storing (very low level signals are prone to static noise and other forms of interference).

The RPC is a very sensitive receiver and long distance reception of mono VHF transmissions should be possible but remember if a stereo transmission is to be received the signal strength must be about 10 times greater to provide acceptable results.

It is possible to receive stereo transmissions on the RPC with an aerial voltage as low as 20µV. But for reliable stereo operation one should aim for a signal of at least 200µV.



The signal levels quoted are approximate.



### **Record Player**

The built-in record player is fitted with a magnetic cartridge wired internally to the amplifier. To replay a gramophone record the PH button must be pressed — button group ②.

Please read the record player instruction book carefully.

The functions start, stop and tone arm lift can be remotely controlled by means of the Tele-Pilot TP 650.

The RPC is permanently wired for stereo operation, but when a mono gramophone record is played it will automatically be reproduced in mono through both loudspeakers.

### **Cassette Recorder**

The built-in cassette recorder has its own mains on/off switch. When listening to a gramophone record or a radio transmission and if you don't intend to record onto cassette, the cassette recorder should be switched off (the cassette recorder illumination will be extinguished).

To replay a cassette the CA button must be pressed — button group ②. To record onto the cassette select the required programme source: RF = radio, PH = built-in record player, BA = external tape recorder, cassette recorder or record player.

Please read the separate instruction book of the cassette recorder. The functions start and stop can be remotely controlled when recording or playing back (with the Tele-Pilot TP 650).

When replaying a mono cassette it will automatically be heard from both speakers in mono.

### **Tape Socket (Universal Socket)**

The socket ②0 on the rear of the RPC can be used to connect a tape recorder or a cassette recorder for both record and replay. Recordings can be made from the internal cassette recorder to an external tape / cassette recorder or vice versa both in stereo and mono.

For connection use the radio socket (or equivalent socket) on the external tape or cassette recorder.

The socket ②0 can also be used for connecting an external record player fitted with a ceramic or crystal cartridge (or a record player fitted with a magnetic cartridge and pre-amplifier).

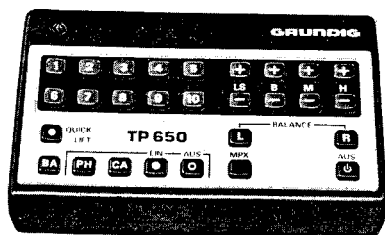
The BA button ② must be pressed to replay from an external tape/cassette recorder or record player or to record onto the built-in cassette recorder any signal presented to the socket ②0. As previously mentioned all mono signals available from equipment according to modern standard will be replayed through both left and right hand channels, however, to ensure that signals from mono tape or cassette recorders of older standard are replayed through both left and right hand channels (in mono), the GRUNDIG mono cable 237 or adaptor 294 must be used.

Please also refer to the operating instructions of the tape or cassette recorder.

### **Simultaneous Rerecording**

During radio reception and replay of records, it is possible to record the corresponding programme (radio or record replay) simultaneously onto the built-in cassette recorder or — via the tape socket ②0 — onto an external tape/cassette recorder.





### Remote Control TP 650


The battery-operated remote control operates with ultrasonic sound and consists of the so-called transmitter, and an ultrasonic receiver which is built into the RPC 650.

Light pressure on the buttons on the transmitter cause different ultrasonic sound frequencies to be transmitted, these are received at the RPC 650 and electronically processed to select the required functions.

### Preparing/using the remote control:

The battery compartment at the bottom of the remote control will be accessible after having opened the snap-lid: Connect a 9 V battery to connection strap, insert into compartment and snap lid in. The light emitting diode at the top of the remote control lights up each time one of the remote control buttons is pressed, this shows the remote control is functioning. If several buttons are operated simultaneously the remote control will not function. The RPC 650 is switched to stand-by as described in paragraph "Operating the Studio".

The following can be remotely controlled:

- The direct selection of station and function (10 x radio programme / BA / PH / CA).  
Selecting any one of these is also simultaneously a "unit-on" command.
- The volume (LS): + louder / - softer
- The bass (B), medium tones (M) and treble (H): + accentuating / - de-emphasizing
- The stereo balance (L = left / R = right)
- The stereo reception stand-by (MPX): on/off
- The commands "unit on" for switching on from the stand-by or "unit off" for switching back into stand-by. The button referred to is marked by the symbol  (symbol for stand-by) and corresponds in its function to the stand-by button on the RPC. It also permits remote control of memory operation from the stand-by mode, i. e. the last selected functions appear again. This button has to be actuated slightly longer than the other buttons.
- The "Quick" command for switching the unit to mute
- Start, stop and tone arm lift of the built-in record player
- Start and stop of tape run when playing back and recording with the built-in cassette recorder.

Remote control with the Tele-Pilot 650 corresponds in its functions to the direct operation on the unit, as described in the paragraphs "Operating the Studio" and "Electronical Control of . . .".

With the MPX button of the Tele-Pilot the unit can be switched to reception stand-by for mono or stereo respectively, by pressing the button repeatedly.

### The built-in record player:

When PH is selected, it is possible to start and stop the record player using the buttons EIN (on) and AUS (off). If the EIN button is pressed during playback of a record, the tone arm will swing back to the beginning of the record and play it once more.

The QUICK/LIFT button controls the tone arm lift function of the record player: By repeatedly pressing the button, the tone arm is raised or lowered respectively.

### The built-in cassette recorder:

When CA is selected, it is possible to start and stop the tape run of the cassette recorder for playback using the buttons EIN (on) and AUS (off). Also for recording at radio reception or when rerecording from external tape recorder (function BA), the start and stop of the tape run can be controlled with the on/off buttons of the Tele-Pilot. The necessary preparations on the cassette recorder are described in the respective operating instructions.

### Note:

The command "MPX off" is automatically cancelled and switched to "MPX on" when one of the programme selection buttons is actuated. The Quick command "mute" is cancelled, as soon as with the corresponding buttons of the remote control the sound volume or balance is altered or a station or a function is selected.

## Technical Specification Radio Section (RF)

### Waveband coverage:

VHF/FM 87.5 – 108 MHz  
LW 145 – 350 kHz  
MW 510 – 1620 kHz

### Sensitivities:

VHF/FM: 1.4  $\mu$ V in 300  $\Omega$  or 0.7  $\mu$ V in 75  $\Omega$  and 15 kHz deviation for 26 dB noise.

AM: MW Band 8 ... 12  $\mu$ V  
LW Band 13.5 ... 22  $\mu$ V

Noise + Signal = 6 dB  
Noise

(modulation depth – 30 %)

### Aerial Sockets:

FM: VHF/FM dipole 300  $\Omega$   
AM: External Aerial and Earth

### Intermediate Frequencies:

FM: 10.76 MHz; AM: 460.5 kHz

### FM Limiting:

Limiting Point, (–1/–2/–3 dB): 1.2/0.9  $\mu$ V in 300  $\Omega$

### IF Bandwidth:

FM-IF, 150 kHz (approx)  
AM-IF, 4.5 kHz (approx)  
FM-demodulator: 900 kHz

### IF Noise:

FM:  $\geq$  86 dB  
AM:  $\geq$  60 dB

### AM Suppression:

$\geq$  50 dB at 1 kHz (measured with 22.5 kHz deviation and 30 % modulation at 1 mV in 300  $\Omega$ ).

### Image Rejection:

FM:  $>$  57 dB  
AM: MW 46 ... 50 dB  
LW 59 ... 66 dB

### AFC Accuracy (VHF/FM):

Switchable, holding/capture range  $\pm$  400 kHz/280 kHz

### Capture Ratio:

$\leq$  1 dB for –30 dB noise at 1 mV in 300  $\Omega$  and 40 kHz deviation.

### FM Signal to Noise Ratio (Unweighted):

To DIN 45 405 in the range 31.5 Hz ... 15 kHz  
40 kHz deviation and 30 Watts output:  
Mono/Stereo:  $\geq$  65/60 dB  
Mono/Stereo:  $\geq$  60/57 dB at 50 mW output

### FM Signal to Noise Ratio (Weighted):

To DIN 45 405 in the range 31.5 Hz ... 15 kHz at 40 kHz deviation and 30 Watts output:  
Mono/Stereo:  $\geq$  65/56 dB  
at 50 mW output:  
Mono/Stereo:  $\geq$  62/56 dB

### Frequency Response (VHF/FM):

Better than DIN 45 500 from aerial input to loudspeaker output.

40 – 6300 Hz  $\pm$  1.5 dB  
6.3 – 15 kHz  $\pm$  2 dB

### Stereo Pilot Leakage:

$\geq$  55 dB at 19 kHz  
 $\geq$  60 dB at 38 kHz

### Distortion:

Mono/Stereo:  $\leq$  0.5 % at 1 kHz and 40 kHz deviation measured at 2 x 30 Watts in 4  $\Omega$ .

### Stereo Decoder:

Integrated circuit PLL decoder with automatic indicator and RF level Mono/Stereo switching. (Level set for 20  $\mu$ V in 300  $\Omega$ ).

### Stereo Crosstalk

1 mV at aerial and 47.5 kHz deviation: –  
1 kHz –  $\geq$  40 dB

250 – 6300 Hz –  $\geq$  38 dB  
6.3 – 10 kHz –  $\geq$  35 dB

Measured at selected points

### Safety Circuits:

To all European norms and IEC Regulations, etc.

### De-emphasis:

50  $\mu$ /secs (norm)

## Audio Amplifier Section (AF)

### Output Power:

measured to DIN 45 500 in 4  $\Omega$ .

Loudspeaker group 1 or 2:  
100 W music power = 2 x 50 W  
60 W nominal power = 2 x 30 W

Loudspeaker groups 1 and 2:  
120 W music power = 4 x 30 W  
40 W nominal power = 4 x 10 W

### Distortion Factor:

$\leq$  0.2 % at 40 ... 20 000 Hz and 2 x 25 W Sinus

### Frequency Response:

BA: 20 ... 20 000 Hz  $\pm$  1.5 dB  
PH: 40 ... 20 000 Hz  $\pm$  2 dB

### Power Bandwidth:

( $<$ 10 ...)  $>$  80 000 Hz at 1 % distortion (to DIN 45 500)

### Intermodulation:

$\leq$  0.3 % at full output, measured at 250 Hz and 8000 Hz with a ratio of 4 : 1 (to DIN 45 403)

### Signal to Noise Ratio:

(to DIN 45 405) for 30 W/50 mW  
PH:  $\geq$  68/57 dB (input 5 mV)  
BA:  $\geq$  82/58 dB (input 500 mV)

### Stereo Crosstalk:

$\geq$  40 dB in the range 40 ... 20 000 Hz  
 $\geq$  60 dB at 1 kHz

### Input Sensitivity and Impedance:

Sensitivity for 30 Watts output:

PH: 1.6 mV / 47 k $\Omega$

BA: 175 mV / 470 k $\Omega$

The PH input is frequency corrected to RIAA at 3180–318 and 75  $\mu$ /secs

### Input Overload Point:

PH:  $\geq$  65 mV  
BA:  $\geq$  6.5 V

### Volume Control Accuracy:

The accuracy of the volume control setting, per channel is 2 dB in the frequency range 20 – 20 000 Hz. With the loudness circuit in operation this figure might be slightly degraded. Bass accentuation (40 Hz) at contour I or II: + 7.5 / + 15 dB; treble accentuation (16 kHz): + 3.5 / + 7 dB.

### Tone Controls:

Setting ranges:  
Bass (40 Hz)  $\pm$  20 dB  
Medium tones (3 kHz)  $\pm$  10 dB  
Treble (16 kHz)  $\pm$  15 dB

### Stereo Balance Range:

Setting range – 18 dB

### Noise Filter:

Roll off, – 3 dB at 7 kHz.

### Output Facilities:

a) Four loudspeaker sockets to DIN 41529 (Impedance 4  $\Omega$ . Minimum impedance 3.2  $\Omega$ ) for stereo in two separate rooms. It is permissible to connect loudspeakers with an impedance of up to 16  $\Omega$  provided that the associated loss in output power can be tolerated. The amplifier is fitted with an automatic short circuit protection device which comes into operation when the output load falls below 2  $\Omega$ .

b) 2 sockets to DIN 45 327 for connecting 2 sets of stereo headphones. Output impedance in the range 5 to 2000  $\Omega$ .

### Damping Factor:

The internal impedance of the amplifier is 0.17  $\Omega$  and when connected to a 4  $\Omega$  load this will give a damping factor of 23.5 (27 dB). This damping factor is improved when using loudspeakers of a higher impedance.

## General:

### Overload Protection

The circuit has been designed so that it will sense open and short circuit loading conditions. It will also sense over capacitive or over inductive loads and the automatic overload protection circuit will then operate. Thermal protection devices have also been fitted to the mains input transformer and onto the heatsinks of the output transistors. These transistors are therefore protected against destruction by overload and high operating temperatures. Should a fault condition occur these overload protection circuits will reset themselves when the fault has been cleared.

### Mains supply: 220 V AC 50/60 Hz

(GB version: 240 V AC 50/60 Hz)

Power consumption: 190 Watts + 1.2 W (record player) + 12 W (cassette recorder) + 6 W (remote control).  
In position "Stand-by": 6 W (remote control).

### Fuses (Mains)

220 V AC: T 1 A (Si 1)

### (Secondary)

2 x T 6.3 A  
T 200 mA  
T 400 mA  
T 50 mA  
T 1 A  
T 100 mA  
(T=surge resisting)

Alterations reserved!